

XXXIV.—A Revision of the Clupeid Fishes of the Genera *Sardinella*, *Harengula*, &c. By C. TATE REGAN, M.A.

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THE genus *Clupea*, as understood by Günther, includes a number of genera which may be arranged in two groups: one of these, characterized by a well-marked median notch in the upper jaw, has been dealt with in a recent paper (*supra*, p. 297); the other group includes genera without a distinct notch in the upper jaw, namely, *Clupea*, *Clupeonella*, *Sardina*, *Sardinella*, *Opisthonema*, *Harengula*, *Lile*, and *Heringia*. Of these I have already published revisions of *Clupea* and *Sardina* ('Annals,' (8) xviii. 1916, p. 1, and xix. 1917, p. 226), and I have nothing to add to Berg's synopsis of *Clupeonella* (*Harengu'a*, Berg, 'Annals,' (8) xi. 1913, p. 480, and Poiss. de l'eau douce de la Russie, p. 30, 1916). The other genera, comprising species that are mostly tropical and strictly marine, form the subject of the present paper.

## SARDINELLA, Val. 1847.

Cuv. &amp; Val. Hist. Nat. Poiss. xx. p. 263.

*Clupeonia*, Cuv. & Val. t. c. p. 345.

This genus is closely related to *Sardina*, Antipa (Regan, Ann. & Mag. Nat. Hist. (8) xviii. 1916, p. 11), from which it differs especially in the absence of radiating grooves on the operculum and in the structure of the posterior margin of the branchial chamber, the vertical edge of the cleithrum being covered by a dermal fold which bears two obtusely pointed projections some distance apart, with a shallow concavity between them. The vertebræ are fewer than in *Sardina*, numbering 44 in *S. gibbosa*, 45 in *S. sindensis*, and 46 in *S. longiceps* and *S. maderensis*.

The majority of the species are tropical, but those of the Eastern Atlantic range into the Mediterranean; most of them are of considerable economic value, both as food-fishes and as a source of oil.

*Synopsis of the Species.*

## I. Ventral scutes sharply keeled.

A. Pelvic fins 9-rayed; a dark spot at edge of operculum.

Eye  $3\frac{1}{2}$  to  $4\frac{1}{2}$  in length of head, which is  $3\frac{1}{2}$  to 4 in length of fish; 110-160 gill-rakers on lower part of anterior arch ..... 1. *aurita*,

Ann. &amp; Mag. N. Hist. Ser. 8. Vol. xix. 25

Eye 5 to 6 in length of head, which is 3 to  $3\frac{3}{8}$  in length of fish; 180-250 gill-rakers on lower part of anterior arch. ....

2. *longiceps*.

B. Pelvic fins 8-rayed; a dark spot at base of anterior rays of dorsal fin.

1. Mediterranean and West African species.

Depth  $3\frac{2}{3}$  to 4 in length; 60 to 95 gill-rakers on lower part of anterior arch (in specimens of 100 to 300 mm.) ....

3. *maderensis*.

Depth  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in length; 110 to 130 gill-rakers on lower part of anterior arch (in specimens of 100 to 200 mm.) ....

4. *eba*.

Depth 3 in length; 90 to 100 gill-rakers on lower part of anterior arch (in specimens of 170 to 200 mm.) ....

5. *cameronensis*.

2. Indo-Pacific species.

Depth  $2\frac{3}{4}$  in length; 130 gill-rakers on lower part of anterior arch ....

6. *dayi*.

Depth  $2\frac{1}{2}$  to 3; gill-rakers 55 to 65; diameter of eye 3 to  $3\frac{1}{2}$  in length of head. ....

7. *brachysoma*.

Depth 3; gill-rakers 48 to 55; diameter of eye  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in length of head. ....

8. *perforata*.

Depth 3 to  $3\frac{1}{2}$ ; gill-rakers 70 to 75 ....

9. *fimbriata*.

Depth  $3\frac{1}{4}$  to 4; gill-rakers 58 to 62 ....

10. *sindensis*.

Depth  $3\frac{1}{2}$  to 4; gill-rakers 50 to 55 ....

11. *gibbosa*.

Depth  $3\frac{1}{2}$  to 4; gill-rakers 35 to 44 ....

12. *melanura*.

II. Ventral scutes feebly keeled.

Maxillary nearly or quite reaching to below eye; 36 to 40 gill-rakers on lower part of anterior arch; pelvics below anterior half of dorsal ....

13. *simu*.

Maxillary not reaching eye; 27 to 31 gill-rakers on lower part of anterior arch; pelvics below origin of dorsal. ....

14. *clupeoides*.

### 1. *Sardinella aurita*.\*

‡ *Clupea caeruleo-rittata*, Richards, Ichth. China, p. 305 (1846)\*.

*Sardinella aurita*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 263, pl. 594 (1847).

*Sardinella anchovia*, Cuv. & Val. t. c. p. 269.

*Meletta mediterranea*, Cuv. & Val. t. c. p. 369.

*Sardinella lemuru*, Bleek. Nat. Tijdschr. Ned. Ind. v. 1853, p. 500.

‡ *Sardinia pseudohispanica*, Poey, Mem. Cuba. ii. p. 311 (1860).

*Clupea aurita*, Günth. Cat. Fish. vii. p. 420 (1868).

*Clupea anchovia*, Günth. t. c. p. 421.

*Clupea melanosticta*, Günth. t. c. p. 430.

*Clupea lemuru*, Günth. t. c. p. 430; Bleek. Atl. Ichth. vi. p. 108, Clup. pl. ix. fig. 1 (1872).

‡ *Clupea pseudohispanica*, Günth. t. c. p. 442.

*Clupea brasiliensis*, Steind. Sitzungsab. Akad. Wien, lxxx. 1880, p. 182.

\* Richardson's description is based on a coloured figure by Reeves, probably, but not certainly, intended to represent this species.

*Clupanodon pseudohispanicus*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1896, p. 423.

*Sardinella anchovia*, Jord. & Everm. *t. c.* p. 429.

*Clupea immaculata*, Kishinouye, Journ. Imp. Fisheries Bureau Tokyo, xiv. 1907, p. 96, pl. xix. fig. 1.

*Sardinella curvina*, Antipa, Denkschr. Akad. Wien, lxxviii. 1906, p. 46 pl. iii. fig. 12.

*Clupea longiceps*, Weber & Beaufort, Fish. Indo-Austral. Archipelago, ii. p. 82 (1913).

Depth of body 4 to  $5\frac{1}{4}$  in the length, length of head  $3\frac{1}{2}$  to 4. Snout as long as or longer than diameter of eye, which is  $3\frac{1}{2}$  to  $4\frac{1}{2}$  in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye; a patch of teeth on the tongue. 110 (young) to 160 gill-rakers on lower part of anterior arch. About 48 scales in a longitudinal series, 12 to 14 in a transverse series; ventral scutes sharply keeled, 18-20 + 13-15. Dorsal 16-20. Anal 15-19. Pelvics 9-rayed, inserted below or behind middle of dorsal. A dark spot at edge of operculum. Vertebrae 47 or 48.

Cape Cod to Rio Janeiro; Black Sea and Mediterranean; Indo-Australian Archipelago, China, and Southern Japan.

The description is based on eight specimens, 120 to 180 mm. long, from Havana, Trinidad, and Rio de Janeiro (*S. anchovia*), several of 110 to 130 mm. from Algiers, the type of *S. lemuru* from Java (145 mm. long) and two examples from China, 180 mm. long (*C. melanosticta*, Günth.). In a very small fish (75 mm.) I count 80 gill-rakers on the lower part of the anterior arch.

The discontinuous distribution of this species is remarkable; in the Indian Ocean it is represented by the allied *S. longiceps*.

## 2. *Sardinella longiceps*.

*Sardinella longiceps*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 273 (1847).

*Sardinella neohowii*, Cuv. & Val. *t. c.* p. 274.

*Alosa scombrina*, Cuv. & Val. *t. c.* p. 442.

*Clupea longiceps*, Günth. Cat. Fish. vii. p. 428 (1868); Day, Fish. India, p. 637.

*Clupea scombrina*, Günth. *t. c.* p. 448.

Depth of body 4 to  $4\frac{2}{3}$  in the length, length of head 3 to  $3\frac{3}{4}$ . Snout longer than diameter of eye, which is 5 to 6 in the length of head; maxillary extending to below anterior part or nearly to middle of eye. 180 to 250 gill-rakers on lower part of anterior arch. 46 to 48 scales in a longitudinal series, 12 or 13 in a transverse series; ventral scutes sharply keeled, 18-21 + 13-15. Dorsal 16-18. Anal 14-16. Pelvics 9-rayed, below or behind middle of dorsal. A dark spot at edge of operculum. Vertebrae 47.

Indian Ocean.

Several specimens, 120 to 180 mm. in total length, from Mombasa, Muscat, and India.

### 3. *Sardinella maderensis*.

*Clupea maderensis*, Lowe, Trans. Zool. Soc. ii. 1839, p. 189.

? *Sardinella granigera*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 267 (1847).

*Clupea maderensis* (part.), Günth. Cat. Fish. vii. p. 440 (1868).

Depth of body  $3\frac{2}{3}$  to 4 in the length, length of head  $3\frac{2}{3}$  to  $4\frac{1}{4}$ . Snout as long as or a little longer than diameter of eye, which is  $3\frac{1}{2}$  to 4 in length of head; maxillary extending to below anterior  $\frac{1}{4}$  of eye. 60 to 95 gill-rakers on lower part of anterior arch. 48 to 50 scales in a longitudinal, 12 or 13 in a transverse series; ventral scutes 19-20 + 14-16. Dorsal 18-19. Anal 18-19. Pelvics 8-rayed, a little in advance of middle of dorsal. A dark spot at base of anterior dorsal rays. Vertebrae 48.

Eleven specimens, 110 to 300 mm. in total length, from Madeira, Cape Verde Is., and Mogadore.

If *S. granigera* be this species, it occurs in the Mediterranean.

### 4. *Sardinella eba*.

*Alosa eba*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 369 (1847).

*Clupea maderensis* (part.), Günth. Cat. Fish. vii. p. 440 (1868).

Depth of body  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in the length, length of head  $3\frac{2}{3}$  to 4. Snout as long as diameter of eye, which is  $3\frac{1}{3}$  to 4 in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye or a little beyond. 110 to 130 gill-rakers on lower part of anterior arch. 44 to 46 scales in a longitudinal, 11 to 13 in a transverse series; ventral scutes 18-19 + 14. Dorsal 18-20. Anal 17-22. Pelvics 8-rayed, below middle of dorsal. A dark spot at base of anterior dorsal rays. Vertebrae 46.

Mediterranean; West Africa.

Eight specimens, 110 to 200 mm. in total length, from Egypt, Algiers, and Nigeria.

### 5. *Sardinella cameronensis*, sp. n.

*Clupea senegalensis* (non Benn.), Günth. Cat. Fish. vii. p. 441 (1868)\*.

Depth of body 3 in the length, length of head 4. Snout

\* *Alosa senegalensis*, Bennett (Proc. Zool. Soc. i. 1831, p. 147), is probably a synonym of *Sardina pilchardus*.

as long as diameter of eye, which is  $3\frac{2}{3}$  in length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 90 to 100 gill-rakers on lower part of anterior arch. 44 scales in a longitudinal, 13 in a transverse series; ventral scutes 18-19+14. Dorsal 18-19. Anal 20-21. Pelvics 8-rayed, below middle of dorsal. Caudal lobes long,  $\frac{1}{3}$  length of fish. A dark spot at base of anterior dorsal rays. Vertebrae 46.

Two specimens, 170 and 200 mm. in total length, from Camaroon.

6. *Sardinella dayi*, sp. n.

Depth of body  $2\frac{3}{4}$  in the length, length of head  $3\frac{1}{5}$ . Snout as long as diameter of eye, which is  $3\frac{2}{3}$  in length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 130 gill-rakers on lower part of anterior arch. 44 scales in a longitudinal and 12 in a transverse series; ventral scutes 19+13. Dorsal 18, nearly equidistant from end of snout and base of caudal. Anal 19. Pelvics 8-rayed, below middle of dorsal. Pectoral  $\frac{3}{4}$  length of head. Silvery; back darker; a blackish spot at base of anterior dorsal rays; upper part of dorsal and edge of caudal dusky.

A single specimen, 125 mm. long, from Karwar, India, presented by N. B. Kinnear, Esq. The species is named in memory of Dr. Francis Day.

7. *Sardinella brachysoma*.

? *Kowala albella*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 362, pl. 602 (1847).

*Sardinella brachysoma*, Bleek. Verh. Bat. Gen. xxiv. 1852, Haringacht. p. 19.

*Harengula hypselosoma*, Bleek. Nat. Tijdschr. Ned. Ind. viii. 1855, p. 427.

*Clupea brachysoma*, Günth. Cat. Fish. vii. p. 423 (1868); Bleek. Atl. Ichth. vi. p. 104, Clup. pl. ix. fig. 4 (1872); Day, Fish. India, p. 635, pl. clxiii. fig. 3 (1878); Weber & Beaufort, Fish. Indo-Austral. Archipel. ii. p. 70, fig. 25 (1913).

*Clupea hypselosoma*, Günth. t. c. p. 431; Bleek. l. c. pl. ix. fig. 2.

Depth of body  $2\frac{1}{2}$  to 3 in the length, length of head 4 to  $4\frac{1}{2}$ . Snout shorter than diameter of eye, which is 3 to  $3\frac{1}{3}$  in length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye or a little beyond. 55 to 65 gill-rakers on lower part of anterior arch. 40 to 44 scales in a longitudinal and 12 or 13 in a transverse series; ventral scutes 17-20+12-13. Dorsal 17-20. Anal 18-22. Pelvics 8-rayed, below or in advance of middle of dorsal. A dark spot at base of dorsal; upper part of dorsal and ends of caudal lobes often dusky.

India; Malay Archipelago.

Seven examples, 100 to 150 mm. in length, from Madras, Java, and Amboina, including the types of the species and of *H. hypselosoma*.

### 8. *Sardinella perforata*.

*Clupeonia perforata*, Cantor, J. As. Soc. Bengal, xviii. 1850, p. 1276.

*Clupalosa bulan*, Bleek, Verh. Bat. Gen. xxii. 1849, Madura, p. 12.

*Spratella kowala*, Bleek, Nat. Tijdschr. Ned. Ind. ii. 1851, p. 492.

*Clupea perforata*, Günth. Cat. Fish. vii. p. 424 (1868); Bleek, Atl. Ichth. vi. p. 110, Clup. pl. x. fig. 2 (1872); Weber & Beaufort, Indo-Austral. Arch. Fish. ii. p. 74 (1913).

*Clupea bulan*, Bleek, Atl. Ichth. vi. p. 110, Clup. pl. viii. fig. 5 (1872).

Depth of body about 3 in the length, length of head 4 to  $4\frac{2}{3}$ . Snout as long as or a little shorter than diameter of eye, which is  $3\frac{1}{2}$  to  $3\frac{2}{3}$  in length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 48 to 55 (58) gill-rakers on lower part of anterior arch. About 44 scales in a longitudinal, 12 or 13 in a transverse series; ventral scutes 17-20 + 10-13. Dorsal 17-20. Anal 17-20. Pelvics 8-rayed, below or in advance of middle of dorsal. A dark spot at base of anterior dorsal rays.

Indian Ocean and Archipelago.

Several specimens, 90 to 130 mm. in total length, including types of the species, of *S. kowala*, and *C. bulan*, from the Persian Gulf and the Malay Archipelago.

### 9. *Sardinella fimbriata*.

*Spratella fimbriata*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 359, pl. 600 (1847).

*Korvata lauta*, Cantor, J. As. Soc. Bengal, xviii. 1850, p. 1279.

*Clupea fimbriata*, Günth. Cat. Fish. vii. p. 427 (1868).

Depth of body 3 to  $3\frac{1}{2}$  in the length, length of head 4. Snout as long as diameter of eye, which is  $3\frac{1}{2}$  to  $3\frac{2}{3}$  in length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye or a little beyond. 70 to 75 gill-rakers on lower part of anterior arch. About 45 scales in a longitudinal and 12 in a transverse series; ventral scutes 18-19 + 12-13. Dorsal 18-19. Anal 18-21. Pelvics 8-rayed, in advance of middle of dorsal. A dark spot at base of anterior dorsal rays; upper part of dorsal and posterior edge of caudal dusky.

Sea of Bengal.

Four specimens, 110 to 125 mm. long, from Akyab, Orissa, Malabar, and Madras (Day), and the types of *K. lauta* (skins) from Pinang.

10. *Sard nilla sindensis*.

*Clupea sindensis*, Day, Fish. India, p. 638, pl. clxiii. fig. 2 (1878).

Depth of body  $3\frac{1}{4}$  to 4 in the length, length of head  $3\frac{2}{3}$  to  $4\frac{1}{3}$ . Snout as long as or shorter than diameter of eye, which is  $3\frac{1}{2}$  to  $3\frac{3}{4}$  in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 58 to 66 gill-rakers on lower part of anterior arch. 44 to 48 scales in a longitudinal, 11 to 13 in a transverse series; ventral scutes 17-19+12-15. Dorsal 17-19. Anal 18-21. Pelvics 8-rayed, below or in advance of middle of dorsal. A dark spot at base of anterior dorsal rays; upper part of dorsal and ends of caudal lobes sometimes blackish.

Indian Ocean and Archipelago.

Thirteen specimens, 95 to 130 mm. in total length, from Sind, Bombay, Amboina, and Formosa.

11. *Sardinella gibbosa*.

? *Clupanodon jussieu*, Lacep. Hist. Nat. Poiss. v. pp. 469, 474, pl. xi. fig. 2 (1803).

? *Cupeonia jussieu*, Cuv. & Val. Hist. Nat. Poiss. p. 346 (1847); Sauvage, Hist. Madagascar Poiss. p. 495.

? *Cupeonia fasciata*, Cuv. & Val. t. c. p. 349.

*Clupea gibbosa*, Bleek. Journ. Ind. Arch. iii. 1849, p. 72; and Atl. Ichth. vi. p. 106, Clup. pl. viii. fig. 6 (1872).

*Spratella tembang*, Bleek. Verh. Bat. Gen. xxiv. 1852, Haringacht. p. 28.

*Clupea tembang* (part.), Günth. Cat. Fish. vii. p. 426 (1868).

*Clupea fimbriata* (part.), Day, Fish. India, p. 637; Weber & Beaufort, Fish. Indo-Austral. Arch. ii. p. 75, fig. 26 (1913).

Depth of body  $3\frac{1}{2}$  to 4 in the length, length of head 4 to  $4\frac{1}{3}$ . Snout as long as or longer than diameter of eye, which is  $3\frac{1}{2}$  to 4 in length of head; maxillary extending to below anterior  $\frac{1}{4}$  or  $\frac{1}{3}$  of eye. 50 to 55 gill-rakers on lower part of anterior arch. 44 to 48 scales in a longitudinal, 11 to 13 in a transverse series; ventral scutes 18-20+13-15. Dorsal 17-20. Anal 17-19. Pelvics 8-rayed, somewhat in advance of middle of dorsal. A dark spot at base of anterior dorsal rays; upper part of dorsal and posterior edge of caudal often dusky.

Indian Ocean and Archipelago.

Eleven specimens, 100 to 160 mm. in total length, from Durban, Mombasa, Ganjam, Madras, Siam, Celebes, Java, and Amboyna, including the type of *S. tembang*.

12. *Sardinella melanura*.

*Clupanodon sinensis*, var., Lacep. Hist. Nat. Poiss. v. pl. xi. fig. 3 (1803).

*Clupea melanura*, Cuv. Règne Anim. ed. 2, ii. p. 318 (1829).

*Clupeonia commersoni*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 350 (1847); Sauvage, Hist. Madagascar Poiss. p. 494 (1891).

*Spratella fimbriata*, Bleek. Verh. Batav. Genootsch. xxiv. 1852, Haringacht. p. 27.

*Harengula melanurus*, Bleek. Nat. Tijdschr. Ned. Ind. v. 1853, p. 245.

*Clupea atricauda*, Günth. Cat. Fish. vii. p. 426 (1868); Bleek. Atl. Ichth. vi. p. 106, Clup. pl. x. fig. 5 (1878); Day, Fish. India, p. 636, pl. clxiv. fig. 5 (1878); Weber & Beaufort, Fish. Indo-Austral. Arch. ii. p. 80 (1913).

*Clupea sundaica*, Bleek. Atl. Ichth. vi. p. 105, Clup. pl. xiii. fig. 5 (1872).

? *Harengula melanura*, Sauvage, Hist. Madagascar Poiss. p. 492, pl. xlviii. fig. 4.

Depth of body  $3\frac{1}{2}$  to 4 in the length, length of head 4 to  $4\frac{1}{4}$ . Snout as long as or a little longer than diameter of eye, which is  $3\frac{1}{2}$  to 4 in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 38 to 44 gill-rakers on lower part of anterior arch. 44 to 46 scales in a longitudinal series, 12 or 13 in a transverse series; ventral scutes sharply keeled, 19-20+13. Dorsal 18-19. Anal 16-18. Pelvics 8-rayed, below or a little in advance of middle of dorsal. A dark spot at base of anterior dorsal rays; ends of caudal lobes usually blackish.

Indian Ocean and Archipelago.

Four specimens, 115 to 160 mm. in total length, including two received from Dr. Bleeker as *H. melanurus* and *S. fimbriata*, which appear to be the specimens figured as *C. atricauda* and *C. sundaica*.

13. *Sardinella sirm*.

*Clupea sirm*, Rüpp. Neue Wirbelth. Fische, p. 77, pl. xxi. fig. 1 (1835-40); Günth. Cat. Fish. vii. p. 425 (1868); Weber & Beaufort, Fish. Indo-Austral. Archipel. ii. p. 62 (1913).

*Sardinella leiogaster*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 270 (1847).

*Sardinella leiogastroides*, Bleek. Nat. Tijdschr. Ned. Ind. vii. 1854, p. 255.

*Clupea leiogaster*, Bleek. Atl. Ichth. vi. p. 102, Clup. pl. iv. fig. 6 (1872); Klunzinger, Zool. Botan. Ges. Wien, xxi. 1871, p. 598; Weber & Beaufort, l. c. p. 61.

*Clupea leiogastroides*, Bleek. l. c. Clup. pl. xiv. fig. 2.

*Clupea pinguis*, Günth. Ann. & Mag. Nat. Hist. x. 1872, p. 425, and Brenchley's Cruise of the 'Curacoa,' p. 426 (1873); Weber & Beaufort, l. c. p. 83.

Depth of body  $4\frac{1}{2}$  to 5 in the length, length of head 4 to  $4\frac{1}{2}$ . Snout longer than diameter of eye, which is  $3\frac{2}{3}$  to  $4\frac{1}{3}$  in the length of head; maxillary nearly or quite reaching

vertical from anterior margin of eye. 36 to 40 gill-rakers on lower part of anterior arch. 42 to 45 scales in a longitudinal, 12 in a transverse series; ventral scutes 16-18+13-15. Dorsal 17-19. Anal 17-20. Pelvics 8-rayed, in advance of middle of dorsal.

Indian Ocean and Archipelago.

Six specimens, 105 to 185 mm. in total length, from Zanzibar, Batavia, Celebes, and Misol, including types of *S. liogastroides* and *C. pinguis*.

#### 14. *Sardinella clupeioides*.

*Amblygaster clupeioides*, Bleek. Journ. Ind. Arch. 1849, p. 73.

*Clupea clupeioides*, Günth. Cat. Fish. vii. p. 425 (1868); Bleek. Atl. Ichth. vi. p. 103, Clup. pl. xiv. fig. 1 (1872); Weber & Beaufort, Fish. Indo-Austral. Archipel. ii. p. 63 (1913).

*Clupea okinawensis*, Kishinouye, Journ. Imp. Fisheries Bureau, Tokyo, xiv. 1907, p. 96, pl. xix. fig. 2.

Depth of body  $3\frac{3}{4}$  to  $4\frac{1}{2}$  in the length, length of head 4 to  $4\frac{1}{2}$ . Snout as long as or a little longer than diameter of eye, which is  $3\frac{1}{2}$  to 4 in length of head; maxillary not extending to below eye. 27 to 31 gill-rakers on lower part of anterior arch. 42 to 44 scales in a longitudinal, 12 in a transverse series; ventral scutes 16-17+12-14. Dorsal 17-19. Anal 16-18. Pelvics 8-rayed, nearly below origin of dorsal.

Malay Archipelago to Riu-Kiu Islands.

Two specimens, 160 and 230 mm. long, the latter the type of the species.

#### OPISTHONEMA, Gill, 1861.

Proc. Acad. Philadelphia, p. 37.

Differs from *Sardinella* in that the last ray of the dorsal fin is prolonged into a filament.

Two species from Tropical America.

##### 1. *Opisthonema oglinum*.

*Clupea thrissa* (non Linn.), Broussonet, Ichth. fasc. 1 (1872); Günth. Cat. Fish. vii. p. 432 (1868).

*Megalops oglina*, Lesueur, J. Ac. Philad. i. 1817, p. 359.

*Opisthonema oglinum*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. \* 1896, p. 432.

Depth of body  $2\frac{4}{5}$  to  $3\frac{2}{5}$  in the length, length of head 4 to  $4\frac{2}{5}$ . Snout as long as or a little longer than diameter of eye, which is  $3\frac{1}{3}$  to 4 in length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 65 (young) to 100 gill-rakers on lower part of anterior arch. 48 to 50 scales in a longitudinal,

15 or 16 in a transverse series ; ventral scutes 17-20 + 13-16. Dorsal 18-20. Anal 22-25. Pelvics 8-rayed, a little in advance of middle of dorsal.

Carolina to Brazil.

Several examples, 85 to 275 mm. in total length.

## 2. *Opisthonema libertatis*.

*Meletta libertatis*, Günth. Proc. Zool. Soc. 1866, p. 603.

*Clupea libertatis*, Günth. Cat. Fish. vii. p. 433 (1868).

*Opisthonema libertate*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1896, p. 433.

*Clupea (Opisthonema) bulleri*, Regan, Ann. & Mag. Nat. Hist. (7) xiii. 1904, p. 255.

Depth of body 3 to  $3\frac{1}{2}$  in the length, length of head  $3\frac{1}{3}$  to  $4\frac{1}{3}$ . Snout as long as or longer than diameter of eye, which is  $3\frac{2}{3}$  to 5 in the length of head ; maxillary extending to below anterior  $\frac{1}{3}$  or nearly to middle of eye. 85 (young) to 165 gill-rakers on lower part of anterior arch. 48 to 50 scales in a longitudinal, 14 to 16 in a transverse series ; ventral scutes 17-19 + 14-16. Dorsal 17-19. Anal 19-21. Pelvics 8-rayed, a little in advance of middle of dorsal.

Pacific coast of Mexico and Central America ; Galapagos Islands.

Several examples, 75 to 250 mm. in total length.

## HARENGULA, Val. 1847.

Cuv. & Val. Hist. Nat. Poiss. xx. p. 277.

This genus has never been properly distinguished from *Sardinella*, but they differ in some important characters. In *Sardinella*, as in *Sardina*, the two last rays of the anal fin are enlarged and the transverse grooves on the scales are paired, their inner ends separated by an interspace. In *Harengula* the posterior anal rays are equal and the transverse grooves on the scales are continuous ; moreover, the lower jaw is more prominent and the sheath at the base of the dorsal fin is lower than in *Sardinella*. I count 39 vertebræ in *H. dispilonotus*, 40 in *H. maculosa* and *H. castelnaui*, 41 in *H. pensacolæ*, 42 in *H. schrammi*, 43 in *H. zunasi*, 43 or 44 in *H. macrophthalma*, and 44 in *H. punctata*.

Like *Sardinella*, this genus occurs in the tropical Indo-Pacific ; but whereas *Sardinella* has four West African and Mediterranean and only one Antillean species, *Harengula* has four species on the coasts of Tropical America, but is absent from the eastern Atlantic.

The species are mostly smaller and of less economic value than those of *Sardinella*, and some of them are reputed poisonous [cf. Cuv. & Val. xx. p. 295 (*H. humeralis* = *macrophthalma*) and p. 377 (*Meletta venenosa* = *H. punctata*)].

### Synopsis of the Species.

#### I. American.

##### A. 27 to 33 gill-rakers on lower part of anterior arch.

- i. Depth of operculum 2, diameter of eye  $2\frac{2}{3}$  to 3 in length of head; depth of body 3 to  $3\frac{1}{2}$  in the length.

##### 1. *maculosa*.

- ii. Depth of operculum more than  $\frac{1}{2}$  length of head, diameter of eye 3 to  $3\frac{1}{3}$  in length of head.

Anal of 16-19 rays. Depth  $3-3\frac{2}{3}$  in the length, head  $3\frac{1}{3}$  to  $3\frac{2}{3}$  .....

##### 2. *macrophthalma*.

Anal of 15 rays. Depth  $2\frac{5}{8}$  ( $-3\frac{1}{3}$ ) in the length, head  $3\frac{1}{4}$  .....

##### 3. *thrissina*.

- B. 33 to 36 gill-rakers on lower part of anterior arch; depth of operculum  $\frac{2}{3}$  to  $\frac{3}{8}$  length of head; eye  $2\frac{3}{4}$  to 3 in head; depth of body  $2\frac{3}{4}$  to  $2\frac{3}{4}$  in the length .....

##### 4. *pensacola*.

#### II. Indo-Pacific.

- A. 35 gill-rakers on lower part of anterior arch; 36 to 38 scales in a longitudinal series .....

##### 5. *dispilonotus*.

- B. 30 to 34 gill-rakers on lower part of anterior arch; 40 to 45 scales in a longitudinal series.

Depth of body  $2\frac{2}{3}$  in the length .....

##### 6. *koningsbergeri*.

Depth of body  $3\frac{1}{3}$  to 4 in the length, length of head  $3\frac{1}{3}$  to 4; eye 3 to  $3\frac{1}{3}$  in length of head .....

##### 7. *punctata*.

Depth of body 4 to  $4\frac{1}{4}$  in the length, length of head 4 to  $4\frac{2}{3}$ ; eye  $3\frac{1}{2}$  to  $3\frac{2}{3}$  in length of head ....

##### 8. *schrammi*.

- C. More than 40 gill-rakers on lower part of anterior arch.

1. Depth of body  $2\frac{1}{2}$  to  $3\frac{1}{5}$  in length; eye 3 in length of head; 45 gill-rakers on lower part of anterior arch.

##### 9. *castelnaui*.

2. Depth of body 3 to 4 in length; eye  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in length of head.

About 50 gill-rakers on lower part of anterior arch;

40 to 42 scales in a longitudinal series; ends of caudal lobes blackish .....

##### 10. *vittata*.

About 50 gill-rakers on lower part of anterior arch;

44 to 46 scales in a longitudinal series; caudal fin uniform .....

##### 11. *zunasi*.

70 gill-rakers on lower part of anterior arch ....

##### 12. *nymphaea*.

### 1. *Harengula maculosa*.

*Harengula maculosa*, Cuv. & Val. Hist. Nat. Poiss. xx. 1847, p. 292.

*Alca apicalis*, Müll. & Trosch. in Schomburgk, Hist. Barbadoes, p. 675 (1848).

*Harengula jaguana*, Poey, Rep. i. p. 190 (1866).

*Clupea macrophthalma*, Günth. Cat. Fish. vii. p. 421.

*Sardinella sardina*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1896, p. 430.

*Sardinella macrophthalmus*, Jord. & Everm. *l. c.*

Depth of body 3 to  $3\frac{1}{2}$  in the length, length of head  $3\frac{1}{3}$  to  $3\frac{2}{3}$ . Snout shorter than or nearly as long as diameter of eye, which is  $2\frac{2}{3}$  to 3 in the length of head and greater than its distance from lower edge of præoperculum; maxillary extending to below anterior part or middle of eye; depth of operculum  $\frac{1}{2}$  length of head. 27 to 33 gill-rakers on lower part of anterior arch. About 40 scales in a longitudinal and 11 in a transverse series; ventral scutes 15-17+10-12. Dorsal 17-19. Anal 17-19. Pelvics 8-rayed, below middle of dorsal. Anterior part of dorsal blackish superiorly. Vertebrae 40.

Several examples, 90 to 200 mm. in total length, from Florida, the Bermudas, and the West Indies.

## 2. *Harengula macrophthalmus*.

*Clupea macrophthalmus*, Ranzani, Nov. Com. Ac. Sc. Inst. Bonon. v. 1842, p. 320, pl. xxiii.

*Harengula latulus*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 280, pl. 595 (1847).

*Harengula clupeola*, Cuv. & Val. *t. c.* p. 289.

*Harengula humeralis*, Cuv. & Val. *t. c.* p. 293.

*Alosa striata*, Cuv. & Val. *t. c.* p. 429.

*Alosa bishopi*, Müll. & Trosch. in Schomburgk, Hist. Barbadoes, p. 675 (1848).

*Harengula sardina*, Poey, Mem. ii. p. 310 (1860).

*Clupea humeralis* (part.), Günth. Cat. Fish. vii. p. 422 (1868).

*Sardinella humeralis* (part.), Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1896, p. 431.

Depth of body 3 to  $3\frac{2}{3}$  in the length, length of head  $3\frac{1}{3}$  to  $3\frac{2}{3}$ . Snout shorter than diameter of eye, which is 3 to  $3\frac{1}{3}$  in the length of head and not greater than its distance from lower edge of præoperculum; maxillary extending to below anterior  $\frac{1}{3}$  of eye or beyond; depth of operculum more than  $\frac{1}{2}$  length of head. 29 to 33 gill-rakers on lower part of anterior arch. About 42 scales in a longitudinal and 11 in a transverse series; ventral scutes 16-19+12-14. Dorsal 16-19. Anal 16-19. Pelvics 8-rayed, below middle of dorsal. A dark humeral spot. Vertebrae 43-44.

Atlantic coast of Tropical America\*.

Numerous examples, 80 to 130 mm. in total length, from Florida, the West Indies, Fernando Noronha, and Bahia.

\* Valenciennes described *H. latula* as a European species; it is probable that this was a mistake, although it is not impossible that the species may cross the Atlantic.

### 3. *Harengula thrissina*.

*Clupea thrissina*, Jord. & Gilb. Proc. U.S. Nat. Mus. 1882, p. 353.

*Sardinella thrissina*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1896, p. 430.

Depth of body  $2\frac{5}{6}$  ( $-3\frac{1}{3}$ ) in the length, length of head  $3\frac{3}{4}$ . Snout a little shorter than diameter of eye, which is  $3\frac{1}{4}$  in the length of head and rather less than its distance from lower edge of præoperculum; maxillary extending a little beyond anterior  $\frac{1}{3}$  of eye; depth of operculum more than  $\frac{3}{5}$  length of head. 30 gill-rakers on lower part of anterior arch. 40 scales in a longitudinal and 12 in a transverse series; ventral scutes 18 + 11 (16 + 13). Dorsal 17. Anal 15. Pelvics 8-rayed, below middle of dorsal. A dark humeral spot.

Pacific coast of Mexico.

A single specimen, 115 mm. in total length, from Jalisco.

### 4. *Harengula pensacolæ*.

*Clupea humeralis* (part.), Günth. Cat. Fish. vii. p. 422 (1868).

*Harengula pensacolæ*, Goode & Bean, Proc. U.S. Nat. Mus. 1879, p. 152.

*Sardinella humeralis* (part.), Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1896, p. 431.

*Sardinella sardina*, Jord. & Everm. t. c. 1900, fig. 193.

Depth of body  $2\frac{3}{5}$  to  $2\frac{3}{4}$  in the length, length of head  $3\frac{3}{5}$  to  $3\frac{4}{5}$ . Snout shorter than diameter of eye, which is  $2\frac{3}{4}$  to 3 in length of head and equal to its distance from lower edge of præoperculum; maxillary extending to below anterior  $\frac{1}{3}$  of eye or beyond; depth of operculum  $\frac{3}{5}$  to  $\frac{2}{3}$  length of head. 33 to 36 gill-rakers on lower part of anterior arch. About 40 scales in a longitudinal and 11 in a transverse series; ventral scutes 16-17 + 13. Dorsal 16-18. Anal 16-18. Pelvics 8-rayed, below middle of dorsal. Vertebrae 41.

Four specimens, 80 to 140 mm. in total length, from Florida and Trinidad.

### 5. *Harengula dispilonotus*.

*Harengula dispilonotus*, Bleek. Nat. Tijdschr. Ned. Ind. iii. 1852, p. 456.

*Clupea dispilonotus*, Günth. Cat. Fish. vii. p. 429 (1868); Bleek. Atl.

Ichth. vi. p. 111, Clup. pl. iii. fig. 3 (1872); Weber & Beaufort, Fish. Indo-Austral. Arch. ii. p. 69 (1913).

Depth of body 3 to  $3\frac{1}{2}$  in the length, length of head  $3\frac{3}{4}$  to 4. Snout a little shorter than diameter of eye, which is 3 in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 35 gill-rakers on lower part of anterior arch. 36 to 38 scales in a longitudinal, 11 or 12 in a transverse series;

ventral scutes 14-16 + 11-13. Dorsal 18-20. Anal 16-18. Pelvics below anterior  $\frac{1}{2}$  of dorsal. A dark spot or ocellus on back at base of posterior dorsal rays, a second behind it.

E. Indian Archipelago.

Six specimens, 75 to 100 mm. in total length, including the type of the species.

#### 6. *Harengula koningsbergeri*.

*Clupea koningsbergeri*, Weber & Beaufort, Verh. Akad. Amsterdam, xvii. no. 3, 1912, p. 14; Fish. Indo-Austral. Arch. ii. p. 72 (1913).

Depth of body  $2\frac{2}{3}$  in the length, length of head  $3\frac{2}{3}$ . Snout shorter than diameter of eye, which is  $2\frac{3}{4}$  in length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye or a little beyond. 33 gill-rakers on lower part of anterior arch. 42 scales in a longitudinal and 12 in a transverse series; ventral scutes 17-18 + 11-12. Dorsal 18-19. Anal 20-21. Pelvics below or a little in advance of middle of dorsal.

A specimen of 115 mm. from N.W. Australia, and one of 75 mm. from New Guinea; the species was described from the Arn Is.

#### 7. *Harengula punctata*.

*Clupea punctata*, Rüppell, Neue Wirbelth. Fische, p. 78, pl. xxi. fig. 2 (1840).

*Clupea quadrimaculata*, Rüppell, t. c. p. 78, pl. xxi. fig. 3.

*Sardinella lineolata*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 272 (1847).

*Harengula punctata*, Cuv. & Val. t. c. p. 297; Sauvage, Hist. Madagascar Poiss. p. 493 (1891).

*Harengula bipunctata*, Cuv. & Val. t. c. p. 298.

*Meletta obtusirostris*, Cuv. & Val. t. c. p. 375.

*Meletta venenosa*, Cuv. & Val. t. c. p. 377.

*Harengula moluccensis*, Bleek. Nat. Tijdschr. Ned. Ind. iv. 1853, p. 609.

*Harengula kunzei*, Bleek. id. xii. 1857, p. 209.

*Harengula spilurus*, Guichenot, in Maillard, Ile de la Réunion Poiss. p. 16 (1865); Sauvage, op. cit. p. 493, pl. xlviii. fig. 3.

*Clupea moluccensis*, Günth. Cat. Fish. vii. p. 427 (1868); Bleek, Atl. Ichth. vi. p. 107, Clup. pl. v. fig. 2 (1872); Weber & Beaufort, Fish. Indo-Austral. Arch. ii. p. 81 (1913).

*Clupea venenosa*, Günth. t. c. p. 449; Weber & Beaufort, t. c. p. 77.

*Clupea kunzei*, Bleek. Atl. Ichth. vi. p. 107, Clup. pl. v. fig. 1 (1872); Day, Fish India, p. 636.

*Clupea dubia*, Bleek. t. c. p. 108.

*Harengula stereolepis*, Ogilby, Proc. Linn. Soc. N.S. Wales, xxii. 1897, p. 759.

*Clupea mizum*, Kishinouye, Journ. Imp. Fisheries Bureau, Tokyo, xiv. 1907, p. 98, pl. xx. fig. 3.

Depth of body  $3\frac{1}{3}$  to 4 in the length, length of head  $3\frac{1}{3}$  to 4. Snout as long as or shorter than diameter of eye, which

is 3 to  $3\frac{1}{2}$  in the length of head, equal to or greater than its distance from lower edge of præoperculum; maxillary extending to below anterior  $\frac{1}{3}$  of eye or a little beyond; depth of operculum about  $\frac{1}{2}$  length of head. 30 to 34 gill-rakers on lower part of anterior arch. 42 to 45 scales in a longitudinal, 11 or 12 in a transverse series; ventral scutes 16-20 + 11-14. Dorsal 17-19. Anal 17-19. Pelvics below or a little in advance of middle of dorsal. Anterior part of dorsal blackish superiorly. Vertebrae 44.

Tropical Indo-Pacific, from E. Africa to the Paumotu Archipelago.

Numerous examples, 60 to 130 mm. in total length, including the types of *H. moluccensis* and *H. kunzei*.

### 8. *Harengula schrammi*.

*Alosa schrammi*, Bleek. Verh. Bat. Gen. xxii. 1849, Bali, p. 11.

*Clupea schrammi*, Bleek. Atl. Ichth. vi. p. 109, Clup. pl. xiv. fig. 3 (1872); Weber & Beaufort, Fish. Indo-Austral Arch. ii. p. 83 (1913).

Depth of body 4 to  $4\frac{1}{4}$  in the length, length of head 4 to  $4\frac{2}{5}$ . Snout a little longer than diameter of eye, which is  $3\frac{1}{2}$  to  $3\frac{2}{3}$  in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 32 to 34 gill-rakers on lower part of anterior arch. About 42 scales in a longitudinal and 12 in a transverse series; ventral scutes 17-18 + 12. Dorsal 18-19. Anal 18-19. Pelvics 8-rayed, below or a little in advance of middle of dorsal. Vertebrae 42.

Malay Archipelago.

Four specimens, 100 to 115 mm. in total length, from Misol and Goram; with these I have compared the type, a small fish in bad condition.

### 9. *Harengula castelnaui*.

*Kowala castelnaui*, Ogilby, Proc. Linn. Soc. N.S.Wales, xxii. 1897, p. 66.

Depth of body  $2\frac{1}{2}$  to  $3\frac{1}{5}$  in the length, length of head about 4. Snout a little shorter than diameter of eye, which is 3 in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  or middle of eye. 45 gill-rakers on lower part of anterior arch. 40 to 42 scales in a longitudinal, 12 in a transverse series; ventral scutes 16-19 + 10-13. Dorsal 17-19. Anal 18-21. Pelvics below middle or anterior  $\frac{1}{2}$  of dorsal. Tip of dorsal and ends of caudal lobes blackish.

New South Wales.

Nine specimens, 130 to 180 mm. in total length.

10. *Harengula vittata*.

*Clupeonia vittata*, Cuv. & Val. Hist. Nat. Poiss. xx. p. 352 (1847).

*Alausa melanurus*, Cuv. & Val. t. c. p. 441.

*Clupeonia jussieni*, Cuv. & Val. op. cit. pl. 599.

*Clupea melanura*, Günth. Cat. Fish. vii. p. 449 (1868); Bleek. Atl. Ichth. vi. p. 111, Clup. pl. xi. fig. 5 (1872); Weber & Beaufort, Fish. Indo-Austral. Arch. ii. p. 72 (1913).

*Harengula vanicoris*, Jord. & Seale, Bull. U.S. Bureau Fisheries, xxv. 1906, p. 187.

*Clupea rechingeri*, Steind. Sitzungsab. Akad. Wien, cxv. 1906, p. 1424.

Depth of body  $3\frac{1}{5}$  to  $3\frac{2}{5}$  in the length, length of head  $3\frac{3}{4}$  to 4. Snout as long as diameter of eye, which is  $3\frac{2}{3}$  to  $3\frac{3}{5}$  in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye or beyond. 50 gill-rakers on lower part of anterior arch. 40 to 42 scales in a longitudinal, 12 in a transverse series; ventral scutes 17+13. Dorsal 16. Anal 18-19. Pelvics below anterior  $\frac{1}{2}$  of dorsal. Basal part of caudal dusky; ends of lobes blackish.

Indo-Pacific.

Two specimens, 80 and 90 mm. in total length, from Celebes and Raiatea.

11. *Harengula zunasi*.

*Clupea kowal* (non Rüpp.), Schleg. Faun. Japon. Poiss. p. 235, pl. vii. fig. 1 (1846).

*Harengula zunasi*, Bleek. Verh. Bat. Gen. xxvi. 1854, p. 117.

*Clupea kowal* (part.), Günth. Cat. Fish. vii. p. 450 (1868).

*Clupea zunasi*, Günth. t. c. p. 451; Kishinouye, Journ. Imp. Fisheries Bureau, Tokyo, xiv. 1907, p. 98, pl. xx. fig. 4.

Depth of body  $3\frac{1}{5}$  to  $3\frac{4}{5}$  in the length, length of head 4 to  $4\frac{1}{2}$ . Snout nearly as long as or shorter than diameter of eye, which is  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye or beyond. About 50 gill-rakers on lower part of anterior arch. 42 to 46 scales in a longitudinal series, 11 or 12 in a transverse series; ventral scutes 17-20+11-15. Dorsal 17-19. Anal 17-20. Pelvics below anterior  $\frac{1}{2}$  of dorsal.

China, Corea, and Southern Japan.

Several specimens, 90 to 140 mm. in total length, from Amoy, China, and from Japan.

12. *Harengula nymphaea*.

*Clupea nymphaea*, Richards, Ichthyol. China, p. 304 (1848); Günth. Cat. Fish. vii. p. 428 (1868).

Depth of body  $3\frac{1}{5}$  in the length, length of head 4. Snout

as long as diameter of eye, which is  $3\frac{1}{2}$  in the length of head; maxillary extending to below anterior  $\frac{1}{3}$  of eye. 70 gill-rakers on lower part of anterior arch. About 40 scales in a longitudinal and 13 in a transverse series; ventral scutes 18+11. Dorsal 17. Anal 20. Pelvics 8-rayed, a little in advance of middle of dorsal.

China.

Here described from the type, 120 mm. in total length.

LILE, Jordan & Evermann, 1896.

Bull. U.S. Nat. Mus. xlvii. p. 429.

This genus is close to *Harengula*, but is distinguished by the well-defined bluish-silvery lateral band and by the absence of scales on the lobes of the caudal fin. The dermal fold on the edge of the cleithrum described in *Sardinella*, which is developed to a greater or less extent in *Harengula*, is absent in this genus.

Three species from America.

### 1. *Lile stolifera*.

*Clupea stolifera*, Jord. & Gilbert, Proc. U.S. Nat. Mus. 1881, p. 339.

*Sardinella stolifera*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1896, p. 431, and 1900, fig. 194.

Depth of body  $3\frac{1}{3}$  to 4 in the length, length of head  $4\frac{1}{4}$  to  $4\frac{3}{4}$ . Diameter of eye 3 in length of head; maxillary extending to below anterior  $\frac{1}{4}$  of eye. 36 gill-rakers on lower part of anterior arch. About 40 scales in a longitudinal, 10 or 11 in a transverse series; ventral scutes 16-18+10-12. Dorsal 15-17; origin nearer to end of snout than to base of caudal. Anal 16-19. Pelvics 8-rayed, below anterior rays of dorsal. A silvery lateral band; ends of caudal lobes blackish. Vertebrae 40 (42).

Pacific coast of Mexico.

Eight specimens, 90 to 100 mm. long.

### 2. *Lile piquitinga*.

*Sardinella piquitinga*, Schreiner & Ribeiro, Arch. Mus. Rio Janeiro, xii. 1903, p. 72.

Depth of body about  $3\frac{1}{2}$  in the length, length of head  $3\frac{3}{4}$  to 4. Diameter of eye  $2\frac{3}{4}$  in length of head; maxillary extending to below anterior  $\frac{1}{4}$  of eye. 33 gill-rakers on lower part of anterior arch. About 40 scales in a longitudinal and 10 in a transverse series; ventral scutes 16-17+10-11.

Ann. & Mag. N. Hist. Ser. 8. Vol. xix.

26

Dorsal 15-18; origin nearer end of snout than base of caudal. Anal 17-19. Pelvics 8-rayed, below anterior part of dorsal. A silvery lateral band. Vertebrae 40.

Coast of Brazil.

Three specimens, 80-90 mm. long, from Pernambuco.

### 3. *Lile platana*, sp. n.

Depth of body 3 in the length, length of head 4. Diameter of eye 3 in length of head; maxillary extending to below anterior  $\frac{1}{4}$  of eye; 23 gill-rakers on lower part of anterior arch. About 40 scales in a longitudinal series; ventral scutes 18+10. Dorsal 14; origin equidistant from end of snout and base of caudal. Anal 18. Pelvics below origin of dorsal. A silvery lateral band.

La Plata.

A single specimen of 45 mm.

## HERINGIA.

*Heringia*, Fowler, Proc. Acad. Philadelphia, lxiii. 1911, p. 207.

*Rhinosardinia*, Eigenmann, Mem. Carnegie Mus. v. 1912, p. 445.

Form moderately elongate, strongly compressed; abdomen sharp-edged. Mouth small, toothless; lower jaw rather prominent, upper without distinct notch; maxillary with a retrorse spine near its proximal end; 2 supramaxillaries. Operculum smooth; suboperculum rounded. Dorsal median, of 13 to 15 rays, without scaly sheath; anal of 15 to 17 rays, with a low scaly sheath; caudal forked, scaly at base, without alar scales. Pelvics 8-rayed, a little in advance of dorsal. 38 to 40 scales in a longitudinal, 9 or 10 in a transverse series; each scale crossed by a transverse groove, from which 2 (fewer anteriorly, more posteriorly) run backwards to the free edge, which is entire. Vertebrae 39.

### 1. *Heringia amazonica*.

*Clupea amazonica*, Steind. Sitzungsab. Akad. Wien, lxxx. pt. 1, 1880, p. 183.

*Rhinosardinia serrata*, Eigenm. Mem. Carnegie Mus. v. 1912, p. 445, pl. lxii. figs. 3, 4.

Depth 3 to  $3\frac{1}{2}$  in length, length of head  $4\frac{1}{2}$  to 5. Diameter of eye 3 to  $3\frac{1}{4}$  in length of head; maxillary extending to below anterior margin or anterior  $\frac{1}{4}$  of eye. 35 gill-rakers on lower part of anterior arch. 38 to 40 scales in a longitudinal, 9 or 10 in a transverse series; ventral scutes keeled

and pointed, 16-17 + 10-11. Dorsal 13-15; origin nearer end of snout than base of caudal. Anal 15-17. Pelvics a little in advance of dorsal. Silvery; back bluish.

Amazon; rivers of Guiana.

Four specimens, 60 mm. long, co-types of *R. serrata*, from British Guiana.

## 2. *Heringia bahiensis*.

*Pellonula bahiensis*, Steind. Sitzungsab. Akad. Wien, lxxx. 1880, p. 181, pl. iii. fig. 2.

*Sardinella pernambucana*, Schreiner & Ribeiro, Arch. Mus. Rio Janeiro, xii. 1903, p. 72.

Maxillary extending to below anterior  $\frac{1}{3}$  of eye. 42 to 44 scales in a longitudinal series. Dorsal 16-17. Anal 16-18. A more or less distinct bluish-silvery lateral band.

Coast of Brazil.

This species seems to be scarcely distinct from the preceding, examples of which also show a faint lateral band in certain lights.

## XXXV.—On new Weevils of the Genus *Mecysmoderes* from India. By GUY A. K. MARSHALL, D.Sc.

### Subfamily CEUTHORRHYNCHINÆ.

#### *Mecysmoderes memecylonis*, sp. n.\*

♂. Colour black; the head with moderately dense setiform scales, those in the middle being brown and the others white; the pronotum sparsely set with inconspicuous dark setæ, and with a longitudinal patch of transverse white setæ on the anterior half on each side; the elytra with a longitudinal stripe on the first interval bordering the thoracic spine and composed of small, ovate, overlapping, yellowish-white scales (the basal half of the stripe usually brownish), being continued behind the spine as a double row of elongate brown scales, partly replaced by white ones near the apex; the remaining intervals each bear a single row of similar brown scales, with a few white ones here and there, except along the immediate base, where all the scales are white; the

\* The types of all the species described here are in the British Museum.